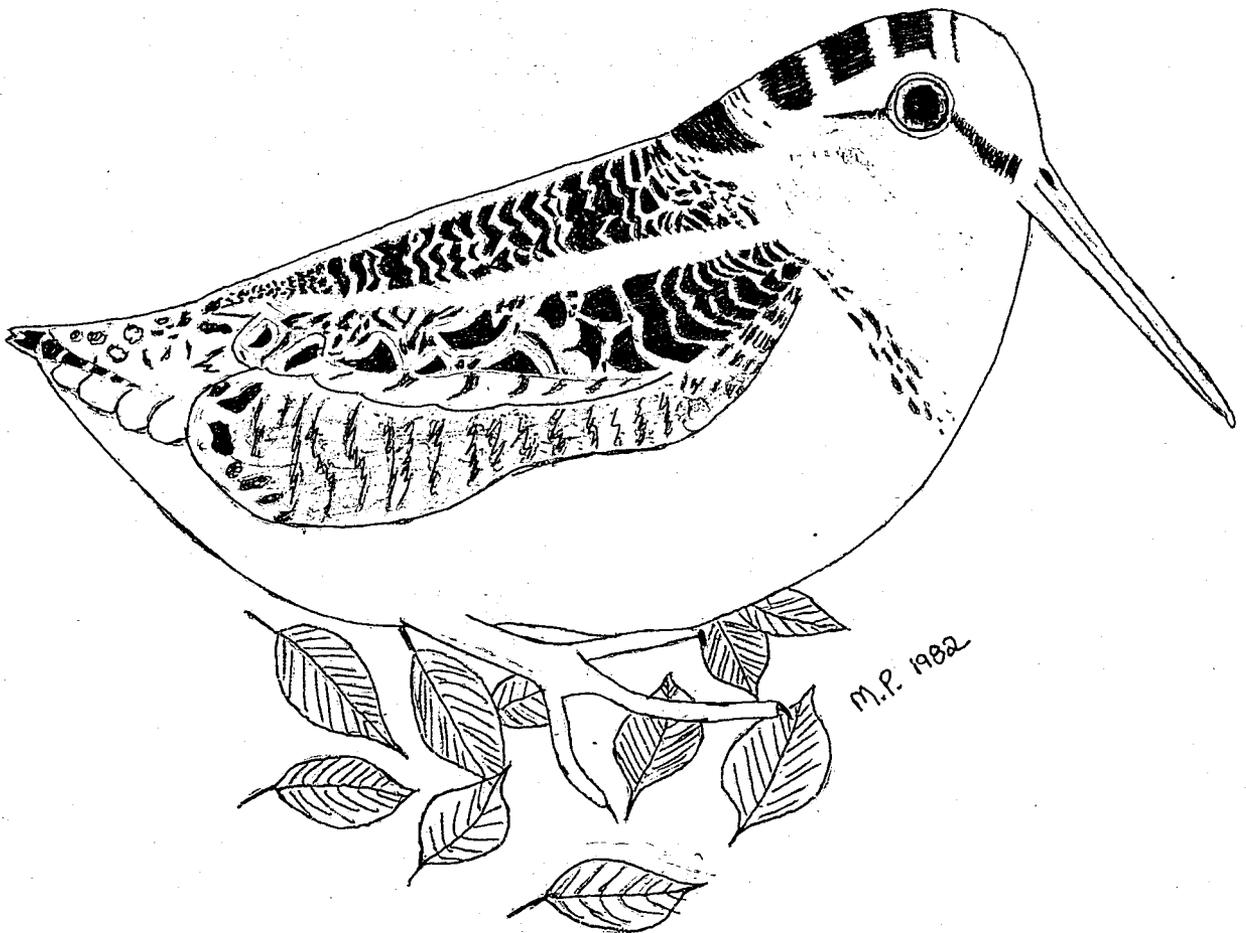


1982

ANNUAL WOODCOCK BANDING REPORT

Moosehorn National Wildlife Refuge



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Respectfully Dedicated To:

The Moosehorn Staff in its entirety.

And to:

Woodcockers Everywhere*

* Not to mention the Wily Woodcock itself

ABSTRACT

Four methods of capturing the American Woodcock (Philohela minor) were used this year at the Moosehorn National Wildlife Refuge in Calais, Maine. These included brood searching using trained bird dogs, mistnetting, nightlighting, and ground trapping. There were 229 total new birds caught this year; three less than the 1981 capture. Many of these birds were fitted with 5 gm radios and tracked using telemetric practices and equipment. This yielded data on survivorship rates of HY birds and the use of diurnal and nocturnal habitat.

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INTRODUCTION

The American Woodcock (Philohela minor) is a popular game bird in eastern North America. The woodcock is a migratory bird wintering along the southern Atlantic seaboard states, and breeding in the northeast United States and maritime provinces. Moosehorn National Wildlife Refuge located in Calais, Maine provides an excellent opportunity to observe and study the American Woodcock since the refuge is situated within the woodcock's breeding range. The Moosehorn Refuge is unique in that it is the only federal refuge devoted to the study of woodcock.

The goal of this research being conducted at the Moosehorn is to develop sound management techniques which can be implemented by small landowners and incorporated into current forest management practices. The study also attempts to better the understanding of the life history, behavior and population dynamics, of this interesting inhabitant of the forests.

The Moosehorn National Wildlife Refuge consists of two separate areas, the Baring and Edmund units, totalling 9176 ha. Most of the research currently being conducted on the refuge occurs on the 6500 ha. Baring Unit which lies on the Canadian-U.S. border.

Wildlife management practices occur in several forms on the refuge, the most prominent being uneven aged management in even aged blocks. Block cuts and strip cuts are being made by private fire-wood cutters, and the Washington County Vocational Technical Institute. The refuge is divided into several areas; each area has a specific rotation age. The rotation times are determined by the type, condition, and age of the cover types present in each area.

These management practices provide woodcock courting and roosting areas. It also rejuvenates brood, nesting and diurnal cover. These practices not only benefit woodcock, but also ruffed grouse, white-tailed deer, and other early successional species.

Prescribed burning is another technique being applied on the refuge. This method is used to clear unwanted slash from the cuts, it also maintains low vegetation heights in certain fields, creates suitable roosting habitat, and controls softwood regeneration while encouraging aspen growth.

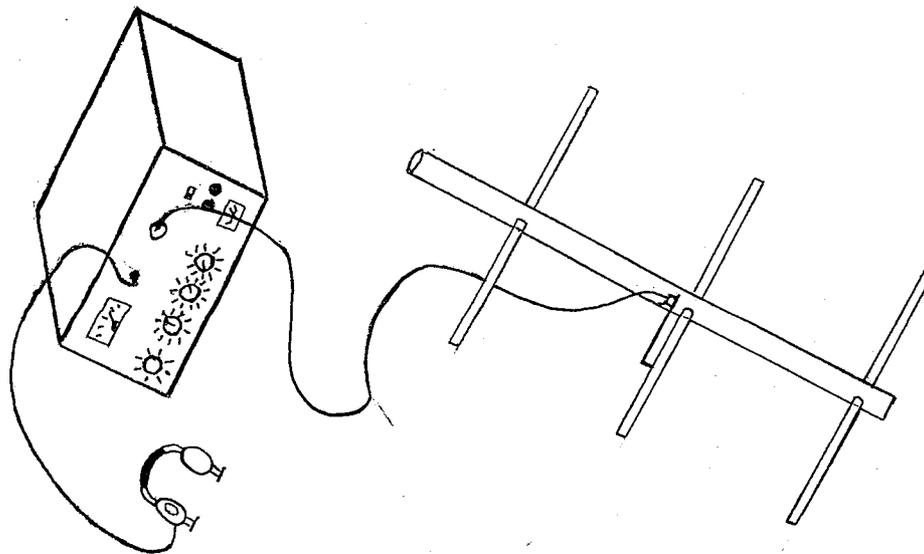
Woodcock research is coordinated by Greg Sepik, refuge biologist. Two federal wildlife technicians, Eric Derleth and Daniel Mcauley, also assisted in the study. Three University of Maine students, one graduate student, and three volunteers also assisted with the field work.

Crew members were David Kane, Scott Lowell and Mark Paglierani, all from the University of Maine at Orono. Volunteers were Andy Cook from University of Connecticut, Brian Root from the University of Massachusetts, and Kristin Wood from University of Vermont. A graduate student from Texas A&M, Judy Mueth Noyes, also assisted with the field work for a period of one month.

The 1982 study season at the Moosehorn began 3 April. Spring activities included mistnetting of singing males, the annual singing ground survey, transects run by bird dogs, brood captures and trapping woodcock. Brood captures were conducted by Dan Mcauley and his bird dog Whiskey. A radio telemetry project also began in June and 69 radio tagged birds were monitored throughout the sum-

mer.

Most of the student crew arrived 17 May and summer work began. Major activities concerned with capturing woodcock were evening mist-netting, singing male mistnetting, nightlighting, and ground trapping. Once the radio telemetry study was in full swing, much of the daily, and nightly, work was shifted from mistnetting and nightlighting to locating radio-ed birds both diurnally and nocturnally. Other activities were vegetation analysis on radio marked birds, transects to determine a population index for both woodcock and grouse, pellet count transects, waterfowl brood counts, prescribed burning, alewife stocking, destroying nuisance beaver dams, trapping nuisance beaver, and rocket netting waterfowl and occasional red-winged blackbirds.



SINGING MALE CAPTURES

This year, the capture of singing male woodcock was conducted from 3 April through 3 June using mistnetting. Once a singing male was located, its flight path to and from the area was noted. The following day, mistnets were set up, surrounding the display area. Half an hour prior to sunset the nets were lowered and birds were caught during their evening flights.

A total of 39 dominant males were caught, along with 3 subdominant males and 3 females. This year's capture is 7 less than the 1981 capture of 46 and 31 less than the 1980 capture of 70. This declining capture probably reflects a declining population due to a severe snowstorm late in the season in each of the past two years.

Table 1. SINGING MALE CAPTURE DATA

	NEW	RETURN	REPEAT	TOTAL
SY-M (dominant)	20	11	0	21
SY-M (subdominant)	2	0	0	2
ASY-M (dominant)	4*	13	1	18
ASY-M (subdominant)	1*	0	0	1
SUBTOTAL	27	14	1	42
Females	2	1	0	3
TOTAL	29	15	1	45

* Includes one bird that was caught as a subdominant and then as a dominant later on in a different area.

BROODS

Broods were caught beginning 16 May and ending 16 June. Broods were caught by USFWS field technician, Dan McAuley, and his English Setter, Whiskey Girl. Broods were also searched for by summer volunteer, Anthony Cook, and his dog, Red Stags Drummer, but none were caught.

Dogs were run through likely brood cover mostly on weekends and days off. When a brood was located, an attempt was made to net the entire brood. Out of 17 total broods caught, 9 females were netted along with the chicks.

This year, 58 chicks were caught, 2 died during netting, one got away, and two had not yet hatched. 58 chicks is a considerable increase from last year's 16, but down from 96 in 1980. The catch this year was much better than the catch last year when the actual number of days spent searching are compared. In 1980, more manpower and dogpower was available which could account for the higher catch that year. Production this year also was very good.

Table 2. BROOD RESULTS

	NEW	RETURN	TOTAL
SY-F	22	0	2
ASY-F	5	2	7
Local Unknown	58	-	58
Total	65	2	67

TRAPLINES

Modified shorebird traps were used to capture woodcock in their diurnal cover. The traps were constructed of 2.5 by 5.0 cm welded wire shaped into circular "cells" with one or more openings. These cells were covered with a nylon net. Leads for the traps were made from lengths of chicken wire staked vertically and running toward the center of each trap opening. Woodcock, when feeding, probe the ground for insects and earthworms, so the earth in and around each trap and along the leads was hoed to attract birds to the trap. The traps work on the principle that woodcock, probing along the bare soil, follow the lead into the trap cell and are unable to escape. Traps were hoed at the beginning of the season and once again during the summer to loosen the soil and clear out invading vegetation.

In addition to the traditional ground traps, a slightly modified version, developed in 1980, was also employed. Based on the same principle of enticing the birds to the softened soil, the new "double lead" traps consisted of 2 cells with a double lead approximately 30 cm wide. A nylon net crossed the span between the two leads. The bottom row of wire on the leads was bent inward to allow the woodcock to enter the tunnel, but not get back out. Only 2 traplines incorporated these new traps; 5 on trapline 76 and 1 on trapline 4.

There were 8 lines operating in 1982, with one newly created line. Each trap consisted of 1 to 4 cells connected by the wire leads. All the traplines were located close to or in alder habitat, a preferred diurnal cover for woodcock. Traps were checked once daily at 8 AM from

6 June to 18 August. A variety of animals other than woodcock were found in traps. Most frequently caught were grouse, robins, and thrushes. After location (trapline and number) was recorded, these were released. Once captured, woodcock were banded, weighed, aged and sexed by wing characteristics, and the bill length measured. Neck band, bill and feet color also were noted. Occasionally, a captured bird was fitted with a radio. In this case, the frequency of the radio was recorded as well.

Trapline operation ran very smoothly except for occasional predations by weasels, and some damage to the head and wings of woodcock because of their attempted escapes. There also was the problem of ruffed grouse chicks dying because of starvation and exposure. Flooding of some traps also occurred during wet periods, rendering them temporarily unusable.

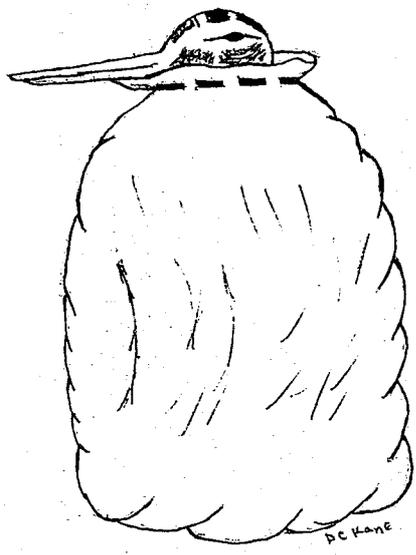


Table 3. Summary of the Age and Sex of Birds Caught in Traps

Trapline #	HY-M	HY-F	SY-M	SY-F	ASY-M	ASY-F	LU	Total
1*	10	6	0	3	0	2	6	27
4	10	4	1	1	0	0	0	16
5	28	9	1	4	0	0	0	42
6	1	3	0	1	0	2	0	7
11	7	1	1	0	1	0	0	10
20	13	4	0	3	0	0	0	20
76	4	7	0	2	0	3	0	16
77	0	1	0	1	0	0	0	2
Total	73	35	3	15	1	7	6	140

* Not included: one AHY bird that was caught

Table 4. Summary of 1982 trapline captures. Given in two week periods and by trapline and cell number. Figures are given as:

birds caught / $\frac{\# \text{ birds caught}}{\text{cell days}}$

TIME PERIODS: I - June 9 - June 17
II - June 18 - July 1
III - July 2 - July 15
IV - July 16 - July 29
V - July 30 - August 12
VI - August 13 - August 18

Table 4. Summary of 1982 trapline captures (cont'd)

<u>LINE 1</u>									
Trap #	Cells	Cell Days	I	II	III	IV	V	VI	Total
1-01	2	28	---	---	---	---	---	---	---
1-02	2	28	5/0.278	---	1/0.036	1/0.036	---	---	7/0.049
1-03	3	42	3/0.111	---	2/0.048	---	---	---	5/0.023
1-04	2	28	---	---	1/0.036	1/0.036	---	---	2/0.014
1-05	3	42	---	2/0.048	---	---	---	---	2/0.009
1-06	2	28	---	---	---	---	1/0.036	---	1/0.007
1-09	3	42	---	---	2/0.048	1/0.024	---	---	3/0.014
1-10	2	28	---	---	2/0.071	---	---	---	2/0.014
1-11	2	28	---	---	1/0.036	---	---	---	1/0.007
1-12	3	42	---	2/0.048	---	---	---	---	2/0.009
1-13	2	28	---	---	---	---	---	---	---
1-14	3	42	---	---	---	1/0.024	2/0.048	---	3/0.014
1-16	2	28	---	---	---	---	---	---	---
Total	31	279/434/186	8/0.029	4/0.009	9/0.021	4/0.009	3/0.007	---	28/0.013

Table 4. Summary of 1982 trapline captures (cont'd)

LINE 4

Trap #	Cells	Cell Days	I	II	III	IV	V	VI	Total
4-11	2	28	---	---	---	---	---	---	---
4-12	2	28	---	1/0.036	---	---	---	---	1/0.007
4-13	3	42	---	---	---	---	---	---	---
4-14	2	28	---	---	---	---	---	---	---
4-15	2	28	---	---	---	---	---	---	---
4-22	2	28	---	---	---	---	1/0.036	1/0.007	2/0.014
4-23	2	28	---	2/0.071	---	2/0.071	---	4/0.028	8/0.056
4-25	3	42	---	---	3/0.071	1/0.024	2/0.048	1/0.005	7/0.033
4-26	2	28	---	---	---	---	1/0.036	1/0.007	2/0.014
4-27	3	42	---	---	---	---	---	---	---
4-28	2	28	---	1/0.036	---	---	1/0.036	---	2/0.014
4-29	2	28	---	---	---	---	---	---	---
Total	27	243/378/162	---	4/0.011	3/0.008	3/0.008	5/0.013	7/0.043	22/0.011

Table 4. Summary of 1982 trapline captures (cont'd)

LINE 5

Trap #	Cells	Cell Days	I	II	III	IV	V	VI	Total
5-01	4	56	---	1/0.018	1/0.018	---	---	1/0.042	3/0.011
5-02	2	28	---	---	1/0.036	---	---	---	1/0.007
5-02.5	2	28	---	1/0.036	1/0.036	1/0.036	---	---	3/0.021
5-04.5	3	42	---	1/0.024	3/0.071	---	1/0.024	---	5/0.023
5-05	4	56	1/0.028	---	---	---	---	1/0.042	2/0.007
5-05.5	2	28	---	1/0.036	---	---	---	---	1/0.007
5-06	4	56	1/0.028	1/0.018	---	---	---	---	2/0.007
5-07	4	56	1/0.028	---	1/0.018	---	---	---	2/0.007
5-08	3	42	5/0.185	3/0.071	---	---	---	---	8/0.038
5-09	2	28	---	---	---	---	---	---	---
5-10	4	56	---	---	---	2/0.036	---	---	2/0.007
5-11	2	28	---	1/0.036	1/0.036	2/0.071	---	---	4/0.028
5-12	4	56	---	1/0.018	---	---	1/0.018	---	2/0.007
5-12.5	3	42	---	---	1/0.024	1/0.024	1/0.024	---	3/0.014
5-13	4	56	---	---	1/0.018	2/0.036	---	---	3/0.011
5-14	3	42	---	---	1/0.024	---	---	---	1/0.005
Total	50	450/700/300	2/0.018	10/0.014	11/0.016	8/0.011	3/0.004	2/0.007	42/0.012

Table 4. Summary of 1982 trapline captures (cont'd)

LINE 6

Trap #	Cells	Cell Days	I	II	III	IV	V	VI	Total
6-01	3	42	---	---	---	---	---	---	---
6-02	2	28	---	1/0.036	---	---	---	---	1/0.007
6-03	2	28	---	2/0.071	---	---	---	---	2/0.014
6-04	2	28	---	---	---	---	---	---	---
6-05	2	28	---	---	---	---	---	---	---
6-06	2	28	---	---	---	---	---	---	---
6-07	2	28	---	---	---	---	---	---	---
6-08	1	14	---	---	---	---	---	---	---
6-10	2	28	---	---	---	---	---	---	---
6-11	2	28	---	---	---	---	---	---	---
6-12	2	28	---	---	---	---	---	---	---
6-13	2	28	---	---	---	---	---	---	---
6-14	2	28	---	---	---	---	---	---	---
6-15	2	28	---	---	---	---	---	---	---
Total	28	252/392/168	---	3/0.008	---	---	---	---	3/0.002

Table 4. Summary of 1982 trapline captures (cont'd)

LINE 11

Trap #	Cells	Cell Days	I	II	III	IV	V	VI	Total
11-01	2	28	---	---	---	---	1/0.036	---	1/0.007
11-02	2	28	1/0.056	---	---	---	---	---	1/0.007
11-03	2	28	---	---	---	---	---	---	---
11-04	2	28	---	---	---	---	---	---	---
11-05	2	28	---	2/0.071	---	---	---	---	2/0.014
11-06	2	28	1/0.056	---	1/0.036	---	---	---	2/0.014
11-13	2	28	1/0.056	---	---	---	---	---	1/0.007
11-15	2	28	---	---	---	---	---	---	---
11-17	1	14	---	---	---	2/0.071	---	---	2/0.028
11-18	1	14	---	---	---	---	---	---	---
Total	18	162/252/108	3/0.019	2/0.008	1/0.004	2/0.008	1/0.004	---	9/0.013

Table 4. Summary of 1982 trapline captures (cont'd)

LINE 20

Trap #	Cells	Cell Days	I	II	III	IV	V	VI	Total
20-01	2	28	3/0.167	---	2/0.071	---	---	1/0.083	6/0.042
20-02	2	28	5/0.278	1/0.036	1/0.036	1/0.036	---	---	8/0.056
20-03	2	28	---	---	1/0.036	---	---	---	1/0.007
20-04	2	28	---	---	---	---	---	---	---
20-05	2	28	---	---	---	---	---	---	---
20-06	2	28	---	---	---	---	---	---	---
20-07	2	28	---	---	---	---	---	---	---
20-08	2	28	---	---	---	1/0.036	---	---	1/0.007
20-09	2	28	---	---	---	---	---	---	---
20-10	2	28	---	---	---	3/0.107	---	1/0.083	4/0.028
Total	20	180/280/120	8/0.044	1/0.004	4/0.014	5/0.018	---	2/0.017	20/0.014

Table 4. Summary of 1982 trapline captures (cont'd)

LINE 76

Trap #	Cells	Cell Days	I	II	III	IV	V	VI	Total
76-02	2	28	---	---	1/0.036	---	---	---	1/0.007
76-03	3	42	1/0.037	---	1/0.024	---	---	---	2/0.009
76-04	2	28	---	1/0.036	1/0.036	---	---	---	1/0.014
76-05	2	28	---	---	---	---	1/0.036	---	1/0.007
76-06	2	28	---	---	---	---	---	---	---
76-07	2	28	---	---	1/0.036	---	1/0.036	---	2/0.014
76-08	2	28	---	1/0.036	1/0.036	---	1/0.036	---	3/0.021
76-09	2	28	---	---	---	---	---	---	---
76-10	4	56	---	---	1/0.018	---	2/0.036	1/0.042	4/0.014
76-11	4	56	---	---	---	---	---	---	---
76-12	4	56	---	---	1/0.018	---	---	---	1/0.004
76-13	4	56	---	---	---	---	---	---	---
76-14	4	56	---	---	---	---	---	---	---
Total	37	333/518/222	1/0.003	2/0.004	7/0.014	---	5/0.010	1/0.005	16/0.006

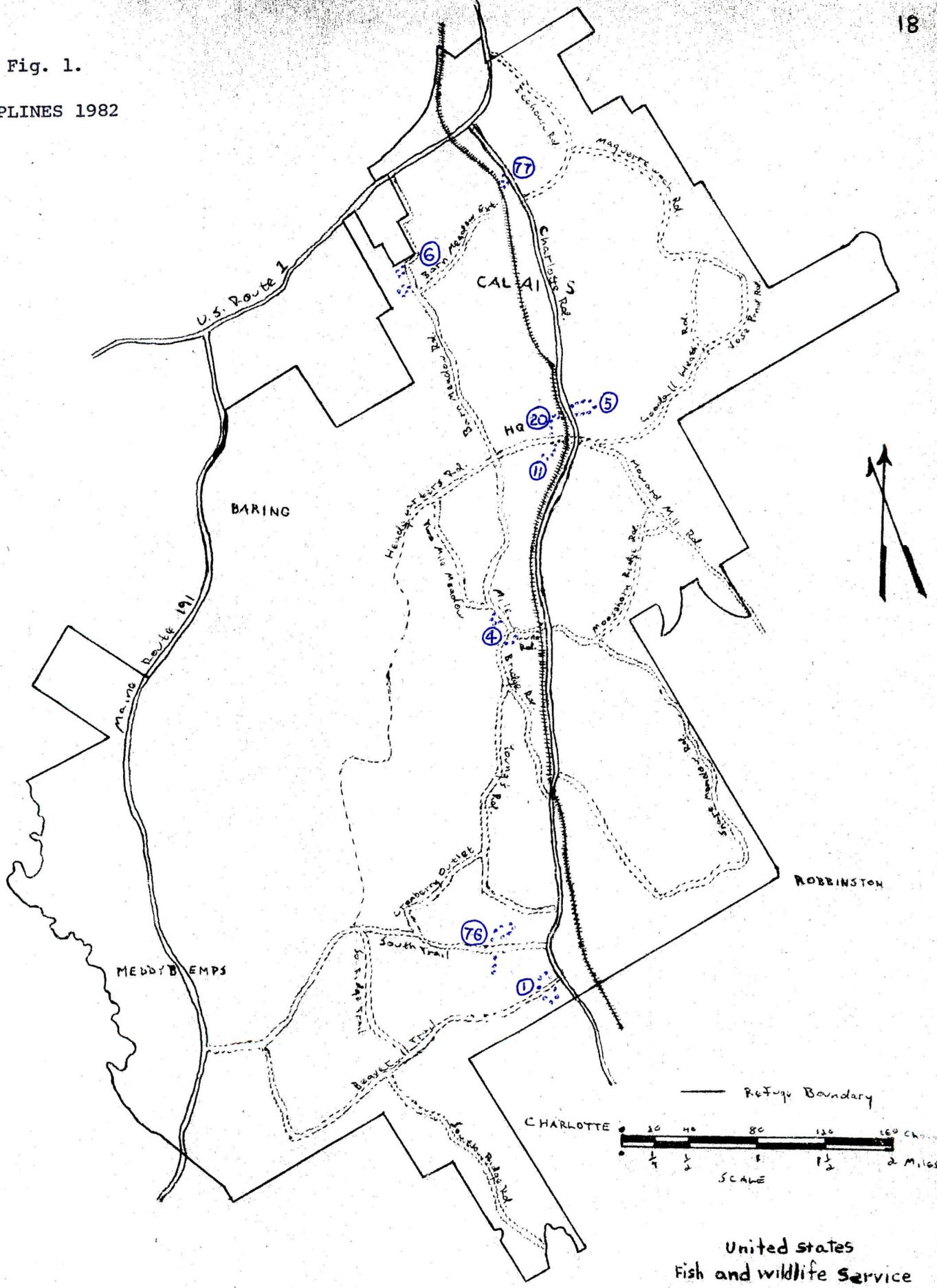
Table 4. Summary of 1982 trapline captures (cont'd)

LINE 77

Trap #	Cells	Cell Days	I	II	III	IV	V	VI	Total
77-01	3	42	---	---	---	---	---	---	---
77-02	2	28	---	---	---	---	1/0.036	---	1/0.007
77-03	2	28	---	---	---	---	---	---	---
77-04	3	42	---	---	---	---	---	---	---
77-05	2	28	---	1/0.036	---	---	---	---	1/0.007
77-06	2	28	---	---	---	---	---	---	---
Total	14	126/196/84	---	1/0.005	---	---	1/0.005	---	2/0.002

Fig. 1.

RAPLINES 1982



Moosehorn National Wildlife Refuge
Washington County Maine

United States
Fish and Wildlife Service

MISTNETTING

Mistnetting began 15 June and ended 3 August. A total of 6 fields were netted. Netting was only done occasionally throughout the summer.

Nets were strategically placed in the fields. In fields that were netted more than once, the nets were usually left standing in the same position. This often led to disastrous events. Destroyed nets and bent poles were found on two occasions; their demise was thought to be directly related to the activity of rowdy bears. In fields where numerous birds were noted flying, but not captured, the net positions were then changed.

One-half hour before dusk and on occasions only five minutes before sunset, the nets were lowered with great expectations. Woodcock evening flights lasted between 20 to 30 minutes. On capture, a woodcock was banded, age and sex determined, and both its bill length and body weight were measured. This year feet color, bill color and the presence of a neck band were also recorded. Other unsuspecting species of birds were also caught. These were quickly released with much cursing. Mosquito capture was quite high on mistnetting nights. It was noted that their evening flight lasted longer than the woodcocks.

Some mistnetted birds were radio marked. The birds were at first released out of a box, but later release was done entirely by hand. The bird's activity after release was noted.

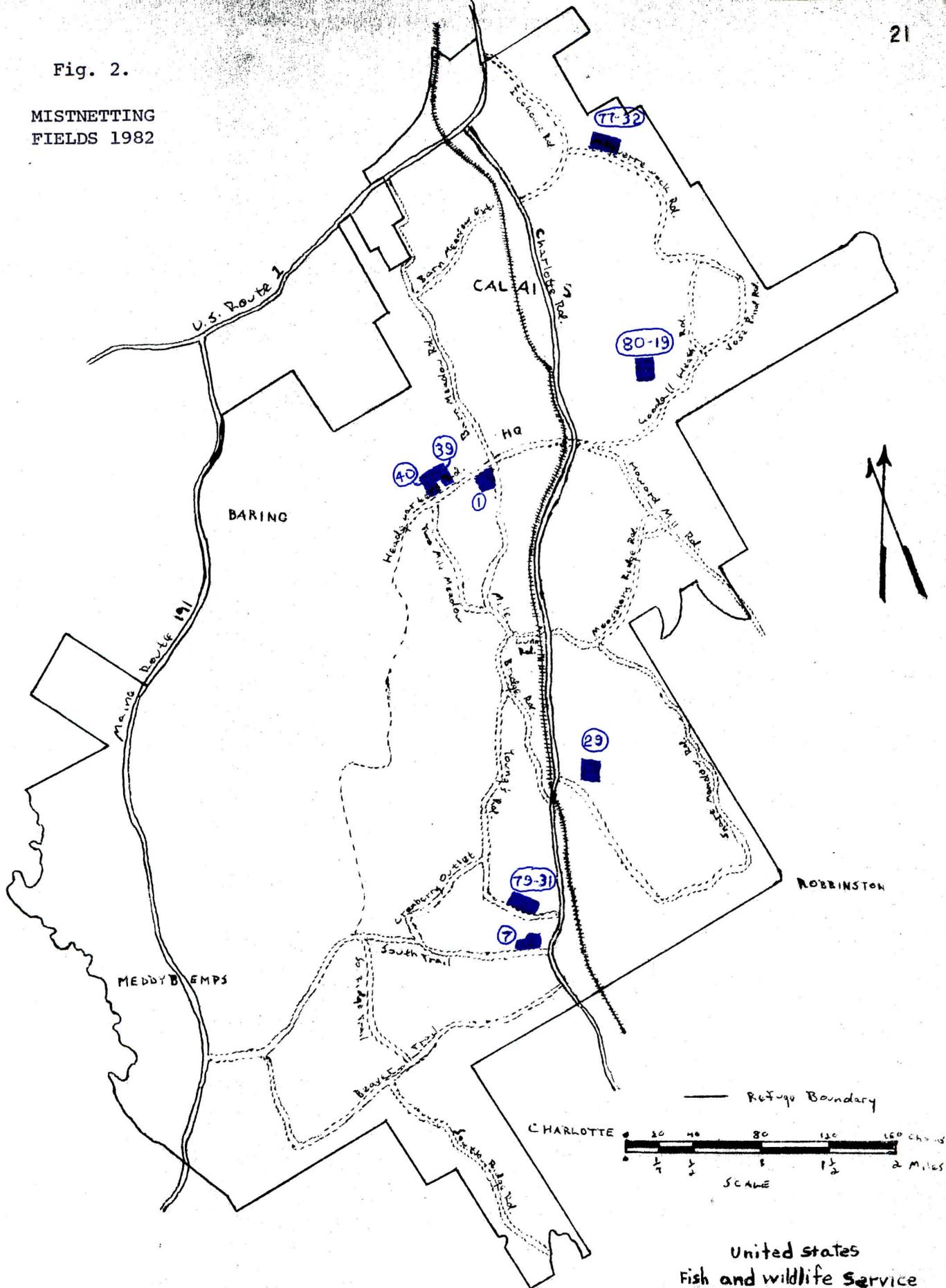
The fields with the heaviest use had high regeneration of aspen and/or maple with interspersed bare areas.

Table 5. Summary of Mist Netting results for the field season, 1982.

Field	Date	#Nets	#Birds	#HY	$\frac{\#HY}{Net}$	#SY	$\frac{\#SY}{Net}$	#ASY	$\frac{\#ASY}{Net}$	$\frac{\#Birds}{Net}$	#♂s	$\frac{\#♂s}{Net}$	#♀s	$\frac{\#♀s}{Net}$
1	7/7	22	1	1	0.05	0	0.00	0	0.00	0.05	1	0.05	0	0.00
	7/12	22	0	0	0.00	0	0.00	0	0.00	0.00	0	0.00	0	0.00
7	6/21	18	6	6	0.33	0	0.00	0	0.00	0.33	3	0.17	3	0.17
29	6/28	13	1	1	0.08	0	0.00	0	0.00	0.08	0	0.00	1	0.08
	7/6	25	1	1	0.04	0	0.00	0	0.00	0.04	1	0.04	0	0.00
39-40	6/21	18	1	0	0.00	1	0.06	0	0.00	0.06	1	0.06	0	0.00
	7/12	8	3	2	0.25	0	0.00	0	0.00	0.38	1	0.13	1	0.13
	7/27	8	0	0	0.00	0	0.00	0	0.00	0.00	0	0.00	0	0.00
77-32	6/15	14	0	0	0.00	0	0.00	0	0.00	0.00	0	0.00	0	0.00
80-19	6/15	20	5	1	0.05	2	0.10	2	0.10	0.25	5	0.25	0	0.00
	7/27	25	6	6	0.24	0	0.00	0	0.00	0.24	5	0.20	1	0.04
	8/2	25	3	3	0.12	0	0.00	0	0.00	0.12	3	0.12	0	0.00
79-31	8/3	20	1	1	0.05	0	0.00	0	0.00	0.05	1	0.05	0	0.00

Fig. 2.

MISTNETTING
FIELDS 1982



Moosehorn National Wildlife Refuge
Washington County Maine

United States
Fish and Wildlife Service

NIGHTLIGHTING

This year nightlighting occurred with mostly good results on nine nights from 14 June to 9 August. There were two basic methods used in nightlighting roosting fields; walking and driving.

When walking, anywhere from 4 to 8 people walk abreast through the fields about 6m apart. White stakes were driven into the ground in several rows of straight lines, aiding in orientation on rainy, dark nights. One or two high powered quartz lights, powered by motorcycle batteries, were used by the lighters. Each lighter had one or two people on each side equipped with long handled nets. A bird was either spotted on the ground and netted, or it was flushed and followed in the light. Once it landed, it was netted.

Three fields had 1.5m wide strips mowed in them using a brush hog. These fields were composed mostly of grass and sedges and could be easily driven through. The strips were used for driving while nightlighting. Three people were needed for this operation, but occasionally a fourth person accompanied the driver to keep him awake. The driving crew consisted of a driver, a lighter, and a netter. The strips were driven at 3-5 mph and birds were captured the same as when walking.

The optimal conditions for nightlighting woodcock roosting fields occurs when it becomes difficult to differentiate the treeline from the horizon. This occurs either when the moon is not out, when there is complete cloud cover and no fog, or when it is raining hard.

The walking method of nightlighting proved to be the more successful of the two methods. This is probably due to the fact that the driven fields had less slash present. The areas which seemed to have the highest concentration of birds were those that are high in slash, but low in old regeneration.

Table 6. Summary of Night Lighting captures for 1982 by field number

FIELD 1

<u>Date</u>	<u>#Birds Caught</u>	<u># Observers</u>	<u>#Hours In Field</u>	<u># Man-Hrs.</u>	<u># Flushes</u>	<u>Total# Birds in Field</u>	<u>T Total# Birds/Man-Hr.</u>
6/14	2	6	1.00	6.00	1	3	0.50
6/29	7	7	1.58	11.06	2	9	0.81
7/20	9	5	1.75	8.75	7	16	1.83

<u>Caught/Man-Hr.</u>	<u># #</u>		<u>#HY #HY</u>		<u>#SY #SY</u>		<u>#ASY #ASY</u>	
	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
0.33	1	1	1	0	0	1	0	0
0.63	4	3	3	2	1	1	0	0
1.03	4	5	3	3	1	1	0	1

Table 6. Summary of Night Lighting captures for 1982 by field number (cont'd)

Field 7

<u>Date</u>	<u>#Birds Caught</u>	<u># Observers</u>	<u>#Hours In Field</u>	<u># Man-Hrs.</u>	<u># Flashes</u>	<u>Total# Birds in Field</u>	<u>Total# Birds/Man-Hr.</u>
7/22	5	8	0.58	4.64	1	6	1.29
	<u>Caught/Man-Hr.</u>		<u># #</u> <u>M F</u>	<u>#HY #HY</u> <u>M F</u>	<u>#SY #SY</u> <u>M F</u>	<u>#ASY #ASY</u> <u>M F</u>	
	1.08		1 4	1 4	0 0	0 0	

Table 6. Summary of Night Lighting captures for 1982 by field number (cont'd)

Field 10

<u>Date</u>	<u>#Birds Caught</u>	<u># Observers</u>	<u>#Hours In Field</u>	<u># Man-Hrs.</u>	<u># Flushes</u>	<u>Total# Birds in Field</u>	<u>Total# Birds/Man-Hr.</u>
6/14	1	6	0.50	3.00	0	1	0.33
6/29	8	7	1.33	9.31	0	8	0.86
7/20	5	5	1.33	6.65	4	9	1.35

<u>Caught/Man-Hr.</u>	<u># #</u>		<u>#HY #HY</u>		<u>#SY #SY</u>		<u>#ASY #ASY</u>	
	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
0.33	0	1	0	0	0	0	0	1
0.86	5	3	4	1	1	1	0	1
0.75	2	3	2	0	0	2	0	1

Table 6. Summary of nightlighting captures for 1982 by field number (cont'd)

Field 11

<u>Date</u>	<u>#Birds Caught</u>	<u># Observers</u>	<u>#Hours In Field</u>	<u># Man-Hrs.</u>	<u># Flushes</u>	<u>Total# Birds in Field</u>	<u>Total# Birds/Man-Hr.</u>
6/22	2	Jeep	0.75	0.75	1	3	4.00
6/30	2	Jeep	0.50	0.50	0	2	4.00
7/22	2	Jeep	0.75	0.75	0	2	2.67
8/05	3	Jeep	1.50	1.50	4	7	4.67

<u>Caught/Man-Hr.</u>	<u># #</u>		<u>#HY #HY</u>		<u>#SY #SY</u>		<u>#ASY #ASY</u>	
	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
2.67	0	2	0	2	0	0	0	0
4.00	1	1	1	0	0	1	0	0
2.67	2	0	2	0	0	0	0	0
2.00	1	2	1	2	0	0	0	0

Table 6. Summary of nightlighting captures for 1982 by field number (cont'd)

Field 22

<u>Date</u>	<u>#Birds Caught</u>	<u># Observers</u>	<u>#Hours In Field</u>	<u># Man-Hrs.</u>	<u># Flushes</u>	<u>Total# Birds in Field</u>	<u>Total# Birds/Man-Hr.</u>
7/14	0	Jeep	0.50	0.50	1	1	2.00
	<u>Caught/Man-Hr.</u>		<u># #</u> <u>M F</u>	<u>#HY #HY</u> <u>M F</u>	<u>#SY #SY</u> <u>M F</u>	<u>#ASY #ASY</u> <u>M F</u>	
	0.00		0 0	0 0	0 0	0 0	

Table 6. Summary of nightlighting captures for 1982 by field number (cont'd)

Field 41

<u>Date</u>	<u>#Birds Caught</u>	<u># Observers</u>	<u>#Hours In Field</u>	<u># Man-Hrs.</u>	<u># Flushes</u>	<u>Total# Birds in Field</u>	<u>Total# Birds/Man-Hr.</u>
6/22	0	Jeep	0.75	0.75	1	1	1.33
7/01	0	Jeep	1.00	1.00	2	2	2.00
7/14	1	Jeep	0.83	0.83	3	4	4.82
8/09	3	Jeep	1.50	1.50	2	5	3.33

<u>Caught/Man-Hr.</u>	<u># #</u>		<u>#HY #HY</u>		<u>#SY #SY</u>		<u>#ASY #ASY</u>	
	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
0.00	0	0	0	0	0	0	0	0
0.00	0	0	0	0	0	0	0	0
1.20	1	0	1	0	0	0	0	0
2.00	0	3	0	3	0	0	0	0

Table 6. Summary of nightlighting captures for 1982 by field number (cont'd)

Field 79-31

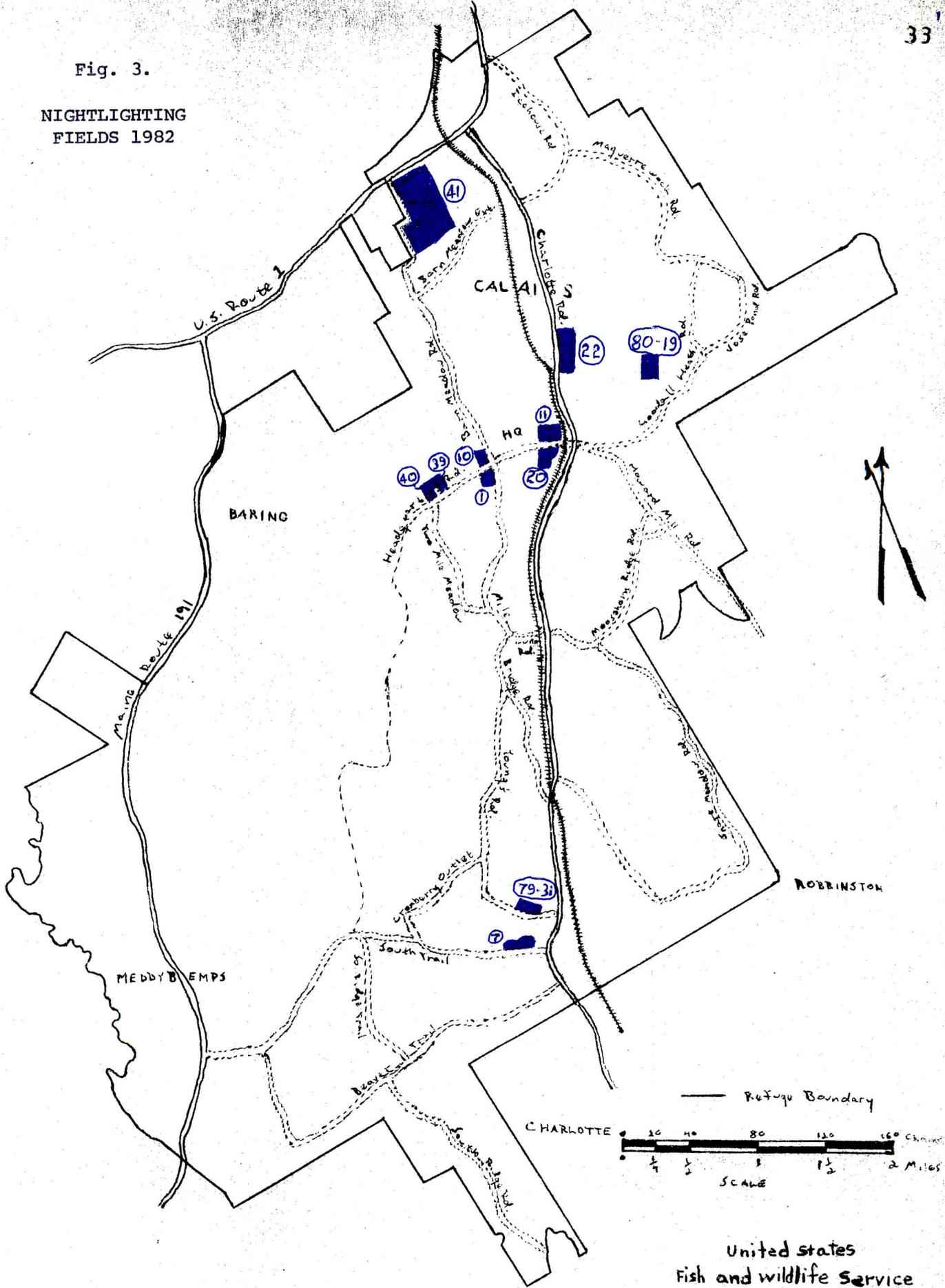
<u>Date</u>	<u>#Birds Caught</u>	<u># Observers</u>	<u>#Hours In Field</u>	<u># Man-Hrs.</u>	<u># Flushes</u>	<u>Total# Birds in Field</u>	<u>Total# Birds/Man-Hr.</u>
7/22	11	8	2.00	16.00	5	16	1.00
	<u>Caught/Man-Hr.</u>		<u># #</u>	<u>#HY #HY</u>	<u>#SY #SY</u>	<u>#ASY #ASY</u>	
			<u>M F</u>	<u>M F</u>	<u>M F</u>	<u>M F</u>	
	0.69		6 5	5 5	1 0	0 0	

Table 6. Summary of nightlighting captures for 1982 by field number (cont'd)

Field 80-19

<u>Date</u>	<u>#Birds Caught</u>	<u># Observers</u>	<u>#Hours In Field</u>	<u># Man-Hrs.</u>	<u># Flushes</u>	<u>Total# Birds in Field</u>	<u>Total# Birds/Man-Hr.</u>
6/29	3	2	1.33	2.66	4	7	2.63
	<u>Caught/Man-Hr.</u>		<u># #</u> <u>M F</u>	<u>#HY #HY</u> <u>M F</u>	<u>#SY #SY</u> <u>M F</u>	<u>#ASY #ASY</u> <u>M F</u>	
	1.13		1 2	0 1	1 0	0 1	

Fig. 3.
NIGHTLIGHTING
FIELDS 1982



Moosehorn National Wildlife Refuge
Washington County Maine

United States
Fish and Wildlife Service

Table 7. Comparison of average woodcock weights by method of capture for each week of the 1982 season.

HATCH-YEAR MALES (HY-M)

Time Periods	Traps		Mist nets		Nightlighting		Total Avg wt (grams)
	Sample	Avg wt size (grams)	Sample	Avg wt size (grams)	Sample	Avg wt size (grams)	
6/04-6/10	-	-	-	-	-	-	-
6/11-6/17	12	127.0	-	-	1	143.0	128.2
6/18-6/24	9	132.0	3	142.3	-	-	134.6
6/25-7/01	8	125.0	-	-	7	148.3	135.9
7/02-7/08	5	125.6	2	156.5	-	-	134.4
7/09-7/15	7	140.9	1	144.0	1	137.0	140.8
7/16-7/22	11	129.6	-	-	13	149.6	140.5
7/23-7/29	6	142.3	5	142.8	-	-	142.4
7/30-8/05	4	127.0	4	162.5	2	142.0	144.2
8/06-8/12	3	132.3	-	-	-	-	132.3
8/13-8/19	4	138.7	-	-	-	-	138.7
8/20-8/26	-	-	-	-	-	-	-

Table 7. Comparison of average woodcock weights by method of capture for each week of the 1982 season.

Time Periods	HATCH-YEAR FEMALES (HY-F)						Total Avg wt (grams)
	Traps		Mist nets		Nightlighting		
	Sample size	Avg wt (grams)	Sample size	Avg wt (grams)	Sample size	Avg wt (grams)	
6/04-6/10	-	-	-	-	-	-	-
6/11-6/17	2	149.0	-	-	-	-	149.0
6/18-6/24	2	170.0	3	169.3	2	174.0	170.9
6/25-7/01	4	169.3	1	175.0	4	186.0	177.3
7/02-7/08	7	166.1	-	-	-	-	166.1
7/09-7/15	5	155.2	1	176.0	-	-	158.7
7/16-7/22	1	144.0	-	-	3	185.7	175.3
7/23-7/29	1	177.0	1	174.0	-	-	175.5
7/30-8/05	4	179.3	-	-	2	183.0	180.5
8/06-8/12	3	157.7	-	-	3	182.3	170.0
8/13-8/19	2	183.0	-	-	-	-	183.0
8/20-8/26	-	-	-	-	-	-	-

Table 7. Comparison of average woodcock weights by method of capture for each week of the 1982 season.

AFTER HATCH-YEAR MALES (AHY-M)

Time Periods	Traps		Mist nets		Nightlighting		Total Avg wt (grams)
	Sample	Avg wt size (grams)	Sample	Avg wt size (grams)	Sample	Avg wt size (grams)	
6/04-6/10	-	-	-	-	-	-	-
6/11-6/17	-	-	4	171.0	-	-	171.0
6/18-6/24	-	-	1	163.0	-	-	163.0
6/25-7/01	1	150.0	-	-	4	157.0	155.6
7/02-7/08	1	138.0	-	-	-	-	138.0
7/09-7/15	-	-	-	-	-	-	-
7/16-7/22	-	-	1	152.0	1	140.0	146.0
7/23-7/29	-	-	-	-	-	-	-
7/30-8/05	2	145.0	-	-	-	-	145.0
8/06-8/12	-	-	-	-	-	-	-
8/13-8/19	-	-	-	-	-	-	-
8/20-8/26	-	-	-	-	-	-	-

Table 7. Comparison of average woodcock weights by method of capture for each week of the 1982 season

AFTER HATCH-YEAR FEMALES (AHY-F)

Time Periods	Traps		Mist nets		Nightlighting		Total Avg wt (grams)
	Sample	Avg wt size (grams)	Sample	Avg wt size (grams)	Sample	Avg wt size (grams)	
6/04-6/10	2	188.0	-	-	-	-	188.0
6/11-6/17	3	164.7	-	-	2	205.5	181.0
6/18-6/24	2	208.0	-	-	-	-	208.0
6/25-7/01	2	169.0	-	-	6	189.8	184.6
7/02-7/08	4	148.8	-	-	-	-	148.8
7/09-7/15	3	185.7	-	-	-	-	185.7
7/16-7/22	2	172.0	-	-	6	191.2	186.4
7/23-7/29	1	174.0	-	-	-	-	174.0
7/30-8/05	-	-	-	-	2	190.0	190.0
8/06-8/12	2	179.0	-	-	-	-	179.0
8/13-8/19	-	-	-	-	-	-	-
8/20-8/26	-	-	-	-	-	-	-

Table 8. 1982 Banding Results

	New Birds	Returns	Repeats
HY-M	65	-	47
HY-F	41	-	22
LU	60	-	3
LF	-	-	-
LM	-	-	-
SY-M	27	2	6
SY-F	15	3	10
ASY-M	6	14	2
ASY-F	15	5	2
UM	-	-	-
AHY-M	-	-	-
AHY-F	-	1	-
UU	-	-	-
Totals	229	25	92

Table 9. YEARLY CAPTURE SUMMARY (1964-1982)

Year	New	Returns	Repeats	Totals
1964	221	17	110	348
1965	151	25	129	305
1966	249	20	135	404
1967	270	22	99	391
1968	191	24	116	324
1969	297	13	123	433
1970	175	31	86	292
1971	221	23	142	386
1972	335	23	173	531
1973	319	16	97	432
1974	381	30	184	595
1975	280	17	92	390
1976	294	20	122	436
1977	423	44	265	732
1978	474	53	257	784
1979	325	55	152	532
1980	344	57	102	502
1981	232	29	51	312
1982	229	25	92	346

New - A bird not previously banded

Return - A previously banded bird captured for the first time that year

Repeat - The capture of a bird previously caught that year

RADIO TELEMETRY

The tracking of radio tagged woodcock, for all practical purposes, got under way this year. Last summer, eleven birds were radio marked and served as a preliminary exercise for this year's telemetry. In total, 69 radios were put on between 15 June and 9 August. Radios were used again after a bird had been predated, died, or dropped its radio. Some radios were used up to four or five times. Sometimes a malfunctioning radio was removed from a bird and replaced with a new radio. Therefore, neither were 69 different birds used nor 69 different radios. The birds used for tracking were caught in ground traps, mistnets, or nets while nightlighting.

Two different radio transmitters were used. One was manufactured by Wildlife Materials, Inc. and the other by Advanced Telemetry Systems, Inc.. They differed only slightly, both being approximately 5 grams in weight, with wire antennae $8\frac{1}{2}$ or 10 inches long.

A variety of harnesses were used with different materials and different techniques. Initially, the radios were glued with cattle tag cement to an area on the back of the bird that had been clipped of feathers. This was tied to the bird with a nylon-type string tied just above the wing and just below the wing. Another string was tied vertically along the belly connecting the two other strings. All knots were super-glued to prevent those clever woodcock from untying them. This harness was used until 12 July. Many birds died or lost much of their body weight due to getting their bills' caught in this type of harness.

From 12 July to 16 July, the radios were attached with no harness;

they were glued to an area of clipped feathers. Birds tended to drop these radios rather easily.

Beginning 17 July, a nylon stocking harness was used, along with the radio being glued to an area of clipped or unclipped feathers. The stocking was cut in a figure-eight shape so that each loop could fit over each wing and rest at the shoulder. This was used until 29 July and also had the problem of birds getting their bills' caught in the harness. Two harnesses of a different type nylon material, but with the same design, were used but did not yield an improvement.

The latest harness was used from 2 August through 9 August (the end of the radio tagging of birds). This harness had one wire loop that was fastened below the wings and twisted together at the belly. The radio was also glued to the back where the feathers were spread apart to expose the skin. This harness was quite successful with no birds getting their bills' caught and only 3 apparently dropped radios out of 18 radio tagged birds.

The actual locations of birds (done with the use of a receiver set to the individual frequency of each radio, a set of headphones, and an antenna) was done once during the day and once at night. Last year's crew initially located their few birds in the morning, afternoon, evening, as well as at night. They soon found this to be unnecessary because the birds rarely moved during the day. This year, two vehicles were mounted with 4-element antennae that enabled one person to scan for birds as he/she drove and to check quickly to see if a bird was in the area without getting out of the vehicle.

Initially, bearings were taken on all birds from places that were known to be detectable on aerial photos. This was time consuming and

found to be impractical at times, yielding unusable data. This was replaced with locating the birds exactly by walking into the area, following the signal. Not only did this method give an exact location, but more often than not, was quicker. Once a bird was found, a distance was measured by pacing or eye-balling to a place known to be detectable on aerial photos. Bearings were still used, however, on birds that were very far away or in inaccessible places.

Using these bearings (usually 3) or the measured distances, the location of a bird could be pinpointed on a set of aerial photos. A grid system was set up on the photos, so the location was expressed as an X-Y coordinate. This was necessary for data analysis by a newly acquired computer data processing system.

Using telemetry, each bird was flushed at least once a week and a 'plot' done. A plot consisted of ground cover analysis, earthworm sampling, shrub density, canopy cover, DBH of trees, soil moisture, and, later on in the summer, a 200-300 gram soil sample.

At times, the woodcock proved to be too wily for we technicians by moving to areas where the signal could not be detected or by moving out of the range of our equipment. This made it especially difficult for us to locate them. Difficulties also came about in malfunctioning receivers, faulty headphones, or broken antenna wires. A signal sometimes was deflected by objects such as rocks and gave a misleading impression of where the bird actually was.

DISCUSSION

In the 1982 season, a total of 254 woodcock were captured; 229 new birds and 25 returns. ~~Ninety-two~~ birds were recaptured. Bird capture was low in the 1982 season. A late spring snowstorm and the greater emphasis placed on radio telemetry were in part related to the decrease in bird capture.

The number of woodcock captured in the 1982 season is about one-half of the total caught in 1978, the record year. Cutting operations on the refuge have resulted in dispersed diurnal habitat and roosting fields. This has led to a lower success rate in trap-line, mistnet, and nightlighting capture of birds.

Fields with a high percentage of slash had high use by woodcock. Fields 80-19 and 79-31 both represent fields with high bird use and high slash cover.

This year radio telemetry received the most attention. The results of the radio telemetry study are beyond the scope of this paper.

